

REMARKS

The invention, as claimed in independent claim 1 is directed to the problem of solder that may accidentally splash on the plastic housing surface of an electronic component during soldering of metal contact portions of the component. As recited in claim 1, an anti-solder coating is applied on that part of the surface that is not to be coated with solder. This coating resists solder and protects the plastic housing against the solder that may accidentally splash on the surface during soldering.

In view of the rejection on a coating applied after soldering in the prior art, dependent claim 28 was added in the last response to emphasize that the coating is present before the component is soldered. Claim 28 thus recites "said component is an unsoldered component." Claim 28 has now been rewritten as an independent claim. Also, new claim 29 is the same as claim 28, except that it recites "prior to soldering of said component at said soldering area" with respect to "covered by an anti-solder coating" to state this in a slightly different way. Also, new claim 30 recites that "said component is apart from any support structure," to state this in another slightly different way, and new claim 31 recites that "said coating has an end, and said coating ends at said component" to make it clear that the claim does not cover a situation where the coating covers both the component and a substrate on which the component has been mounted.

Claim 28 stands rejected under 35 USC 112, first paragraph for failing to provide a written description, the Examiner stating that "[t]he specification is silent regarding 'said component is an unsoldered component,'" and that "[a]s can be seen in figure 1, applicant clearly shows in figure 1 that component (1) [is] mounted to a substrate (7) by solder (3)." The Examiner asks: "What does applicant mean by 'unsoldered component?'"

Addressing the question first, applicants state that "unsoldered component" means a component that has not been soldered, i.e., prior to soldering.

Fig. 1 does show a soldered component, but this is only to make clear how an anti-solder coating according to the invention reduces solder splash on component surfaces that are not being soldered by comparison to Fig. 2, described as a "conventional electrical component [lacking the anti-solder coating used in the invention] with solder splash." (specification p. 5,

lines 5-6). Showing the component in use in Fig. 1 after soldering, however, does not at all indicate that the claims cannot be directed to the component before it has been soldered.

The specification repeatedly refers to the product before and during soldering (as well as after soldering), and makes it crystal clear that the anti-solder coating is on the component before it is soldered (which it of course must be in order for it to be effective in avoiding solder splash). Examples of such references in the specification are on page 2, lines 5-6 (“on [...] component surfaces not intended for soldering”), on page 2, lines 15-17 (“...which is of decisive importance during pick-and-place processes used in surface-mounting techniques”) and on page 3, second paragraph (“for the reduction of solder splash on surfaces [...] not intended for soldering”). This provides abundant written description support for the limitation “unsoldered component” in claim 28, and the limitation “prior to soldering of said component at said soldering area” in new claim 29 and the limitation “said component is apart from any support structure” in claim 30.

Claims 1-7 and 27-28 stand rejected under 35 USC 103(a) as being obvious over the Fig. 2 prior art of the specification in view of Higgins.

As indicated above, Fig. 2 shows a device that does not have an anti-solder coating and that does have undesirable solder splash.

While Higgins does disclose a layer of a material, polysiloxane, that has anti-solder properties, and it is applied to areas on the Higgins device that are not soldered, the material is applied after soldering, so it could not possibly ever function as an anti-solder coating or avoid solder splash.

Higgins is thus totally devoid of any teaching with respect to anti-solder properties, and thus provides absolutely no motivation or suggestion to modify the Fig. 2 prior art. This is not a 35 USC 102 situation where a single anticipatory prior art reference is silent as to a property recited in a claim but describes a material that inherently discloses that property such that the single reference inherently meets each and every limitation in the claim. Under 35 USC 103(a), where a rejection involves modifying a primary reference base upon a secondary reference, there must be a teaching or suggestion that provides the motivation for somebody skilled in the art to make the modification to arrive at the claimed invention. Here there is none. Higgins is silent as

to anti-solder properties and does not address the problem of solder splash or the solution.

Higgins also does not inherently obtain any anti-solder benefit, because the coating at issue is not applied until the device is already soldered.

The combination of Fig. 2 and Higgins accordingly does not suggest the subject matter of independent claim 1, and claim 1 is allowable under 35 USC 103(a).

Claims 2-7 and 27 depend on claim 1 and add features further distinguishing the prior art. E.g., dependent claim 2 recites that “that the anti-solder coating essentially consists of siloxane,” and dependent claim 4 recites that “the anti-solder coating is essentially based on methyl-polysiloxane,” and dependent claim 5 recites “the anti-solder coating is essentially based on dimethyl-polysiloxane,” and dependent claim 6 recites “the anti-solder coating is essentially based on polyether-modified dimethyl-polysiloxane”. The Examiner rejects claims 2, 4, 5, 6 as being obvious over prior art in view of Higgins. The polysiloxane layer in Higgins, however, is not claimed as an anti-solder coating, but as an electrical shielding. Furthermore, neither methyl-polysiloxane, dimethyl-polysiloxane, polyether-modified dimethyl-polysiloxane nor siloxane are claimed as anti-solder coatings in Higgins. Therefore, it is not at all obvious for a person skilled in the art to apply siloxane, methyl-polysiloxane, dimethyl-polysiloxane or polyether-modified dimethyl-polysiloxane, as an anti-solder coating, just because Higgins employs polysiloxane for electrical shielding. The subject matters of dependent claims 2, 4, 5 and 6 therefore are not obvious over Fig. 2 prior art in view of Higgins for these additional reasons, as well as the reasons already stated for claim 1.

Independent claims 28, 29, 30 and 31 include all of the limitations of claim 1 and are allowable for the reasons already stated for claim 1. In addition, claim 28 recites that the component is unsoldered, and claim 29 recites “covered by an anti-solder coating prior to soldering of said component at said soldering area,” and claim 30 recites that “said component is apart from any support structure” making it absolutely explicit that the coating is something that is there before soldering. Claim 31 in addition recites that “said coating has an end, and said coating ends at said component,” making it clear that the claim does not cover a situation

where the coating covers both the component and a substrate on which the component has been mounted, e.g., as is the case where the coating is applied after soldering.

As noted above, there is absolutely no motivation to combine Higgins with Fig. 2, and this provides a first basis establishing the nonobviousness of claims 28, 29, 30 and 31.

If, *arguendo* only and contrary to law and fact, one were to combine Higgins with Fig. 2, one would coat the component after it has already been soldered, and coat the substrate as well, exactly as Higgins teaches. Higgins describes an electronic component 13 (referred to as a "semiconductor die") that is first connected by solder balls 14 to conductive substrate pads 18 and is thereafter coated on top with layer 24, which is applied after soldering the semiconductor die to the substrate pads 18 and which is applied to the substrate as well for the purposes of preventing short circuiting and increasing resistance to environmental stresses. As described at col. 6, lines 18-35:

In accordance with the present invention, after die 13 is properly attached to substrate 16 and the appropriate electrical connections to the substrate are made, a conformal insulative layer or coating 24 is dispensed and cured over the die and other regions of substrate 16 which will be shielded to prevent emission or coupling of EMI. Coating 24 is applied directly on the die and portions of the substrate to prevent electrical short circuiting to a subsequently deposited conductive layer(s). Thus, coating 24 should be a highly insulative material. A secondary purpose of layer 24 is to increase the reliability of device 12 by increasing resistance to environmental stresses. Coating 24 in a preferred embodiment is a pure polymer having a low modulus of elasticity, such as a silicone gel or elastomer, polyurethane, epoxy, polysiloxane, acrylic, and the like. Coating 24 could also be a filled polymer system where the particulate filler was a highly insulative material such as specific ferrite and/or ceramic dielectric material. (emphasis added).

Higgins thus teaches coating not only the device but also the substrate on which it is mounted. Higgins does not disclose coating before soldering, and in fact quite clearly teaches away from that, because it is important in Higgins to coat the substrate as well.

A person of ordinary skill in the art combining the teachings of Higgins and Fig. 2 would thus do the coating after the component of Fig. 2 has already been soldered and subjected to solder splash as shown in Fig. 2. It would not be an unsoldered component with a coating, as

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Page : 8 of 8

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required by claim 28. The resulting structure also would not be a component "covered by an anti-solder coating prior to soldering" as required by claim 29. The resulting structure also would not be a component "apart from any support structure" required by claim 30. The resulting structure also would not be have a "coating [that] ends at said component" as required by claim 31.

Accordingly the subject matters of independent claims 28, 29 30 and 31 are nowhere suggested by the cited references, and these claims are allowable under 35 USC 103(a). Claims 8-26 which were previously withdrawn have now been cancelled.

Enclosed is a \$172 check for excess claim fees. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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